## Revisions

<table>
<thead>
<tr>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>July 2016</td>
<td>Initial release.</td>
</tr>
<tr>
<td>August 2016</td>
<td>Revision 1.1. Enhancements for <strong>Connecting to the Direct-Connection Agent</strong> section.</td>
</tr>
<tr>
<td>December 2016</td>
<td>Updated to include support for NVIDIA M10 GPU.</td>
</tr>
</tbody>
</table>

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About Dell Precision Appliance for Wyse – VMware Horizon

Please read this guide in its entirety. This appliance does NOT come preconfigured or ready for use. The tasks in the Deploying your appliance section must be completed to begin using the appliance.

The Dell Precision Appliance for Wyse – VMware Horizon is a virtualization appliance consisting of a Dell PowerEdge server, VMware ESXi 6.0 U2, and graphics processing units (GPUs) to deliver graphics-enabled virtual desktops. Available for the appliance is the Dell Quick Start Tool (QST) for simplifying and accelerating the deployment process. The QST can perform appliance and initial VM level configuration for the supported vGPU GRID VDI (virtual desktop infrastructure) options. The appliance is a compute only resource intended for integration into an existing VMware Horizon environment.

The appliance is available in a 2U (two rack unit) rack form factor based on the Dell PowerEdge R730 server. The appliance is configured in the factory with ESXi hypervisor pre-installed on the internal SD card, one or two GPU cards, and choice of processors, memory, disks, and network cards. iDRAC8 is also included for out of band systems management. For more details about the Dell Precision Appliance for Wyse – VMware Horizon hardware configuration and the supported vGPU (virtual graphics) configurations, please refer to the Dell Precision Appliance for Wyse – VMware Reference Architecture document.

This document provides the necessary tasks to setup and configure the Dell Precision Appliance for Wyse – VMware Horizon. It is assumed that the reader has technical familiarity and experience with VMware vSphere and VMware Horizon; Windows and Linux operating systems, and related technologies mentioned in this document.

NOTE: The disks and network ports may vary depending on the components ordered with your appliance.
2 Documentation

This section provides information about the documents that Dell recommends for reviewing. Also, make sure that you read through any media that ships with your appliance.

WARNING: See the safety and regulatory information that shipped with your system. Warranty information may be included with this document or as a separate document.

2.1 Dell Precision Appliance for Wyse – VMware Horizon documentation

Documentation for deploying and using the Dell Precision Appliance for Wyse – VMware Horizon is available at this link.

2.2 Dell hardware documentation

Dell hardware documentation is included with your shipment and available on the Dell website at support.dell.com. To access the documentation:

1. On the Dell Support page, click Product Support, and then click Browse for a product.
2. Click the Servers, Storage & Networking link, click PowerEdge, and then click your server model.

NOTE: Alternately, the appliance’s Service Tag number can be entered on the support page for accessing the documentation. Refer to the Locating Your System Service Tag section to locate your service tag number.

3. On the Product Support page, click the Manuals link to view the necessary documentation.

Dell reference documentation

<table>
<thead>
<tr>
<th>To learn about…</th>
<th>Refer to…</th>
</tr>
</thead>
<tbody>
<tr>
<td>How to install your R730 Dell Precision Appliance for Wyse in a rack</td>
<td>Rack Installation and Cable Management Arm Installation, Dell PowerEdge R730 and R730xd Getting Started With Your System</td>
</tr>
<tr>
<td>Hardware details of your R730 Dell Precision Appliance for Wyse (including hardware troubleshooting)</td>
<td>Dell PowerEdge R730 and R730xd Owner’s Manual</td>
</tr>
</tbody>
</table>

2.3 Virtualization software documentation

For VMware Horizon documentation, see VMware Horizon 7 Documentation.
### 2.4 Software Components and Prerequisites

The **Required software and versions** table below describes the driver/firmware/software versions that were validated at the time this document was under development. The versions listed below are the minimum that are required for successful installation and configuration. The software versions listed in the table are available at the Dell.com/support for Dell PowerEdge R730, NVIDIA Support, and VMware Support sites respectively. Since URLs and software locations can change, specific file names and versions are provided in the table below to help with locating the software.

#### 2.4.1 Supported operating systems for this release:

The operating systems listed below are supported for VMware Horizon vGPU deployments with NVIDIA GPUs. The QST also supports creating VMs for the Guest OS’s listed. Guest OS installation is a separate process that takes place outside of the QST. For additional Guest OS support, refer to the VMware Documentation Center for Horizon 7, [Supported Operating Systems for Horizon Agent](https://www.vmware.com/support/horizon/operating_systems.html) section, and the [NVIDIA GRID VIRTUAL GPU User Guide, Guest OS Support](https://www.nvidia.com/page/grid-virtual-gpu.html) section.

- **VMware Horizon 7 Support:**
  - Windows 7
  - Windows 8.1
  - Windows 10
  - Red Hat Enterprise 6.6 & 7
  - CentOS 6.6 & 7
  - Ubuntu 12.04 & 14.04 LTS

- **Quick Start Tool (QST) Support for VM creation:**
  - Windows 7
  - Windows 8.1
  - RHEL 6/7.x
## 2.4.2 Required software and versions

The software versions listed in the table below were used during validation, and are the recommended minimum versions. Please refer to support.dell.com for the latest PowerEdge R730 software, and the NVIDIA software that you receive after purchasing the NVIDIA GRID licenses.

<table>
<thead>
<tr>
<th>Software</th>
<th>Description</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Server OS</strong></td>
<td>VMware vSphere ESXi</td>
<td>Dell Custom Image: 6.0 U2 – Build 3620759</td>
</tr>
<tr>
<td>R730 BIOS</td>
<td>BIOS for the Appliance</td>
<td>2.0.1</td>
</tr>
<tr>
<td>R730 Firmware</td>
<td>Firmware for the Appliance</td>
<td>2.30.30.30</td>
</tr>
<tr>
<td>iDRAC with Lifecycle</td>
<td>Server Out of Band Management and</td>
<td>2.30.30.30</td>
</tr>
<tr>
<td>Controller</td>
<td>Configuration</td>
<td></td>
</tr>
<tr>
<td>Virtual Desktop OS</td>
<td>Microsoft Windows</td>
<td>Windows 7 x64</td>
</tr>
<tr>
<td>Virtual Desktop OS</td>
<td>Red Hat Enterprise Linux</td>
<td>6/7</td>
</tr>
<tr>
<td>VMware HW Version</td>
<td>Hardware version for the virtual machine</td>
<td>11</td>
</tr>
<tr>
<td>NVIDIA GPU Driver</td>
<td>NVIDIA GRID vGPU Host driver for VMware vSphere ESXi 6.0, and Client Drivers for Win7 and Win8.1</td>
<td>NVIDIA-vGPU-VMware_ESXi_6.0_Host_Driver_361.45.09-OEM.0.0.2494585.vib</td>
</tr>
<tr>
<td></td>
<td></td>
<td>362.56_grid_win8_win7_64_bit_english.exe</td>
</tr>
<tr>
<td>NVIDIA GPU Driver</td>
<td>NVIDIA GRID vGPU Host driver for VMware vSphere ESXi 6.0, Driver for Linux</td>
<td>NVIDIA-Linux-x86_64-361.45.09-grid.run</td>
</tr>
</tbody>
</table>

**NOTE:** The QST provisions the VIB to the ESXi host.
3 Licensing overview

This section reviews the high level process for receiving and installing licenses for VMware Horizon, and vSphere; and NVIDIA GRID for vGPU.

3.1 Receiving licenses

3.1.1 VMware

Your VMware Horizon license, if purchased from Dell, will be provided to you after your order is fulfilled. You will receive an email that contains instructions for how to access the license after your order is fulfilled.

VMware ESXi 6.0 U2 is installed in the factory (only installed to SD cards in Dell factory) with a trial license that is valid for 60 days. You can use this license for ESXi until you can purchase them through Dell or your existing license procurement process.

3.1.2 NVIDIA

GRID licenses are available for purchase from NVIDIA and Dell in most areas. Please contact your Dell or NVIDIA Sales Team for more information.

The NVIDIA GRID LICENSING User Guide has details for how the licensing work, available editions, and specific GRID vGPU and Virtual Workstation requirements when licensing Windows or Linux virtual machines and guest operating systems (Guest OS). Installing licenses

3.1.3 VMware and QST

The Quick Start Tool (QST) for Dell Precision Appliance for Wyse will prompt you for the hypervisor license key. Entering the license key is an optional step, and as noted above, ESXi is installed in the factory with trial license keys, so a non-trial version is not required for the initial appliance configuration, but it is recommended if you have them available. Refer to the Deploying Your Appliance section in this guide for more information about the QST.

3.2 Virtual desktop OS license and activation

The desktop operating system must be activated on each virtual desktop that is deployed. Microsoft allows for activating volume license products via Key Management Service (KMS), Multiple Activation Key (MAK), and Active Directory-based Activation (for newer products only). Dell recommends using KMS or Active Directory-based Activation (if applicable for your environment). When using one of these volume activation models, specify a Generic Volume License Key (GVLK) for your desktop OS product key. The GVLKs are also referred to as KMS Client Setup Keys and are posted online by Microsoft. Setting up volume activation is beyond the scope of this document.

For Linux based desktop operating systems, refer to your specific distribution’s license and support activation process and system.
NOTE: The QST supports the installation of Windows 7, Windows 8.1, Windows 10, or RHEL 6/7 for the desktop template at this time. To create templates using a different desktop OS, allow the tool to complete the deployment using one of the supported operating systems and then refer to the Virtualization software documentation for information on manually creating a template VM with the OS of your choice. Be aware that OS's other than Windows 7, 8.1, or RHEL 6/7.x may not be supported for Horizon Grid vGPU.
4 Deploying your appliance

This section contains information for the two deployment phases. The first phase includes prerequisite steps, cabling the appliance, what to expect at first boot, guidelines for creating a vSwitch, joining an existing vSphere and VMware Horizon infrastructure, setting up and configuring the NVIDIA GPUs in the R730, and using the Quick Start Tool (QST).

Once the first phase is completed, the deployment moves into a second phase which comprises installing and configuring the vGPU enabled Guest OS’s in the VMs that the QST creates.

Throughout the phases and for more complex steps, references to vendor specific instructions and documentation are included where possible so as to reflect the most current vendor documentation.

4.1 Prerequisites

Before you begin, the following prerequisites must be fulfilled:

1. Review the Dell Precision Appliance for Wyse – VMware Horizon Reference Architecture document. Doing so will provide important architectural and technical information not contained in the Dell Precision Appliance for Wyse – VMware Horizon Deployment Guide (this document).
2. Review the Known Product Limitations section in the NVIDIA GRID vGPU for VMware vSphere Release Notes.
3. Determine the vGPU profile(s) that you plan to configure and deploy. Information about the vGPU profile options are available in the vGPU Profiles section in the Dell Precision Appliance for Wyse – VMware Horizon Reference Architecture document, the NVIDIA GRID Licensing Guide, and the NVIDIA GRID vGPU User Guide.
4. Ensure the hard disk drives, power supply units (PSUs), and fan components are properly seated and have not become dislodged and/or damaged during shipping.
5. Install the appliance in a rack. A compatible rack and a rack installation kit is required. For information, see the Rack Installation and Cable Management Arm Installation documents.
6. An enterprise/datacenter class network switch that supports a minimum connection speed of 1 Gbps must be available to connect the appliance (10Gbps networking is recommended for optimum performance). Refer to the Cabling Your Appliance section in this guide for details about connecting your network cables.
7. Connect a monitor, mouse, and keyboard to your appliance. Alternatively, you can connect a KVM (not included) to the appliance or use the iDRAC for remotely accessing. Refer to your Dell PowerEdge Owner’s Manual for information about using iDRAC.
8. Determine the following IP address information that will be used by the appliance:
   a. Appliance IP address (for the ESXi hypervisor running directly on the appliance)
   b. Primary NTP server IP address used by your local network (optional)
   c. Secondary NTP server IP address used by your local network (optional)
9. All required software license files/keys. Refer to the Licensing Overview section for more information.
10. Determine the name you will use for the ESXi host’s datastore
11. The system on which you will install the QST must be able to communicate with the ESXi host’s IP address
12. Access to the installation files for the applications you want to use in your virtual desktops.
13. For the desktop virtualization VMs:
a. Access to your Microsoft Windows Linux desktop OS installation media/files and volume license key, or registration information.
b. CPU and memory requirements for your virtual desktops. The QST will provide options for CPU, Disk, GPU, and memory profiles.

### 4.2 Cabling your appliance

By default, appliances are sold with network cards that contain two 10Gbps ports + two 1Gbps ports. It is recommended that two 10Gbps ports are connected, teamed, and used for your virtualization environment. For further details on vSwitch teaming, please refer to the Dell Precision Appliance for Wyse – VMware Horizon Reference Architecture document.

![Dell PowerEdge R730 network cabling](image)

The blue lines (connections) represent the production network ports used by the appliance and virtual machines (VMs). The orange line (connection) represents the iDRAC connection for remote management of your system.

**NOTE:** At least one of the 10Gbps network ports must be connected for the appliance to function optimally. Dell recommends that you connect both 10Gbps network ports to achieve the best performance. If you’ve ordered additional 10Gbps network cards, they can be added to a vSwitch configuration specific to your infrastructure requirements.

### 4.3 First boot experience

After the prerequisites are fulfilled and your appliance is correctly cabled, turn on the appliance to perform the first boot tasks:

1. Install ESXi on the SD card
   a. If your R730 came with ESXi pre-installed on the SD card, then the following steps to install the hypervisor can be skipped
   b. To access the VMware ESXi 6.0 Dell Custom Image:

2. On the Dell Support page, click Product Support, and then click Browse for a product.
3. Click the **Servers, Storage & Networking** link, click **PowerEdge**, and then click your server model.

**NOTE:** Alternately, the appliance’s Service Tag number can be entered on the support page for accessing the documentation. Refer to the [Locating Your System Service Tag](#) section to locate your service tag number.

4. On the **Product Support** page, click the **Drivers & downloads** link.
5. Click on the **Change OS** link.
6. Select the VMware ESXi 6.0 **radio button**.
7. Click on the **Enterprise Solutions** link.
8. VMware ESXi downloads in ISO Image format will show as available.
9. Click on the **View Details** link.
10. Click on the **Download** link.
11. **Download** and save the ISO file.
12. Click on the **Installation instructions** link.
13. **ISO installation options** are shown, along with additional installation instruction links from Dell and VMware.
14. **Complete** ESXi installation.
15. **Restart** the R730 server after successfully completing ESXi hypervisor installation.

16. Access the ESXi console via a local keyboard, mouse, and monitor or from an iDRAC Virtual Console session
   a. Configure the ESXi Username and Password per your organizations requirements
   b. Configure the ESXi Management Network
      i. IPv4 Configuration
         1. Assign an IP Address. The IP Address must be reachable from the system on which you will run the QST.
      ii. DNS Configuration
         1. Assign a hostname
         2. If DNS is also configured then your host will have an FQDN (fully qualified domain name). The QST can communicate with the ESXi host via IP Address or FQDN.

17. Join the appliance to an existing vSphere Datacenter and VMware Horizon environment.
18. Create a vmfs based datastore if not already present, and provide a name for the datastore that matches your organizations datastore naming schema. The QST will look for a datastore, and if not present, the tool will not be able to create the VMs.

### 4.4 Creating a network team and virtual switch

It is recommended to create a teamed virtual switch for the appliance to function optimally. The recommended network, VLAN, and vSwitch configuration details are noted in the **Virtual Networking Section** in the [Dell Precision Appliance for Wyse – VMware Horizon Reference Architecture](#).

**NOTE:** There are various virtual networking design options, and best practices available. Depending upon your organizations vSwitch standards, and logical and physical network topologies and implementation; the
virtual networking implementation may vary from the recommendation. Please consult with your networking team and VMware Networking (vSphere 6.0, ESXi 6.0, vCenter Server 6.0) for additional information.

4.5 Joining appliance to a vSphere Datacenter and VMware Horizon Infrastructure

As noted above in the First boot experience, the Quick Start Tool (QST) can configure the appliance after it is joined to an existing vSphere Datacenter and VMware Horizon environment.

For more information, refer to the VMware vSphere 6.0 Documentation Center for how to join an ESXi host to an existing vCenter infrastructure. The Documentation Center for VMware Horizon 7 has information for how to integrate the desktops on the appliance into an existing VMware Horizon infrastructure.

4.6 NVIDIA GPU Configuration

This section provides steps and information required to configure the GPU and the VIB driver.

4.6.1 Required files

After paying for the licenses to use the GPU card, you can access all files that are required to use the GPU card.

The files required for the GPU are:

1. NVIDIA GPU Mode switch software: gpumodeswitch.iso
2. NVIDIA License server software
3. NVIDIA driver for the ESXi server [.vib graphics driver file]
4. NVIDIA driver for the Client VM (Guest OS)
5. NVIDIA documentation
   a. License Guide
   b. Release Notes
   c. User Guide

4.6.2 GPU mode switch

The NVIDIA GPU allows different graphic modes to be used with the card: Graphics or Compute. For the Dell Precision Appliance for Wyse, the GPU cards must be set to Graphics mode. Depending upon when your appliance was purchased, the mode may already be set in the factory.

Follow the process below to verify, or set the GPU card into Graphics mode.

The gpumodeswitch virtual media is bootable media that contains a “light” Linux like environment so that you can run the NVIDIA commands to configure the GPUs as shown in the steps below.

1. Power up the server (if not already running and booted into ESXi).
2. Connect to the iDRAC 8’s Web Interface via a browser.
a. For more information, refer to the Integrated Dell Remote Access Controller 8 (iDRAC8) User's Guide

3. Launch the Virtual Console.
4. From the Virtual Console user interface, click on the Virtual Media menu option, then select Connect Virtual Media.
5. Chose the Map CD/DVD option.
6. In the Virtual Media – Map CD/DVD dialog box, click on Browse.
7. In the Open dialog box, browse to the directory that contains the gpuswitchmode.iso.
8. Select the gpuswitchmode.iso, and click Open.
9. Click on the Next Boot menu option, then select Virtual CD/DVD/ISO option.
10. Click on the Power menu option, then select the Reset System (warm boot) option. When the R730 reboots, it will boot into the gpuswitchmode environment that is available from the Virtual Media that you mounted.
11. At the gpumodeswitch console, type: gpumodeswitch --listgpumodes
12. The gpumodeswitch --listgpumodes command will show the mode currently set for the GPU cards.
13. To set the GPU cards to Graphics mode, type: gpumodeswitch --gpumode graphics
14. Reboot the R730 after setting the gpumode to graphics.
15. To reboot the appliance, from the iDRAC 8 Virtual Console select the Next Boot menu option, and click on Normal Boot.
16. In the iDRAC 8 Virtual Media Console, select the Power menu option, then select Reset System (warm boot) option.
17. The R730 will reboot into ESXi.

For more information, refer to the NVIDIA GRID ENTERPRISE SOFTWARE Quick Start Guide and the NVIDIA GRID VIRTUAL GPU User Guide.

If you have more than one Dell Precision Appliance for Wyse, then repeat the steps above.

4.6.3 NVIDIA driver installation [.vib]

For vGPU shared graphics, it is required to install a .vib driver file onto the ESXi host. The VIB can be installed manually or via the QST. To install the VIB manually, follow the steps in this section. If you plan to use the QST, then the steps directly below (in this section) can be skipped.

To do so, follow the steps below:

1. Copy the .vib file from the download location to the local datastore on the ESXi server.
2. Access the ESXi host from an iDRAC 8 Virtual Console, or a remote SSH console session.
3. Enter the username and password credentials.
4. At the ESXi Shell, type: nvidia-smi
5. The nvidia-smi command will return the currently installed vib driver version, along with other GPU specific hardware attributes. Specifically, a line will list, for example: NVIDIA-SMI 352.32 Driver Version: 352.32
6. If the driver version listed in your console session does not match the version you downloaded as noted in the Required files section, then you will need to uninstall the currently installed driver. If the installed driver version does match, or a driver is not present, then you can skip Steps 9-10, and proceed to Step 11.

7. Enter Maintenance Mode for the ESXi host.

8. At the ESXi Shell console session, type: `esxcli system maintenanceMode set --enable true`

9. At the ESXi Shell console session, type: `esxcli software vib remove --n <name of the old vib driver>`
   a. **Note:** This step is only required if the vib driver does not match as indicated above.

10. To complete uninstalling the vib driver, a server reboot is required. To reboot the server, at the ESXi Shell console session, type: `reboot`
    a. **Note:** This step is only required at this point if you are uninstalling the vib driver.

11. To install the vib driver, at the ESXi Shell console type: `esxcli software vib install --v <name of the driver>`

12. Exit Maintenance Mode. At the ESXi Shell console type: `esxcli system maintenanceMode set --enable false`

13. To complete installing the vib driver, a server reboot is required. To reboot the server, at the ESXi Shell console session, type: `reboot`

14. Confirm that the GPU and vib driver are configured as expected. To do so:
    a. Complete Steps 2-6 above

For more information, refer to the NVIDIA GRID ENTERPRISE SOFTWARE Quick Start Guide and the NVIDIA GRID VIRTUAL GPU User Guide.

If you have more than one Dell Precision Appliance for Wyse, then repeat the steps above.

4.6.4 NVIDIA consolidation settings

ESXi uses what NVIDIA describes as a “breadth-first allocation scheme for vGPU-enabled VMs”. This scheme is the default, and adds new vGPU-enabled VMs to the GPU that has the least load. Physical GPU sharing is minimized in this approach, so the total number of GPUs may be less than what is possible with a consolidated approach.

When the graphics card is set to consolidation, or a “depth-first” scheme, new vGPU-enabled VMs are assigned to, then the two GPU processors on one GPU card might not be loaded equally. In consolidation mode, virtual machines are assigned to the same GPU until the maximum number possible is reached, then the next GPU processor will be loaded.

This could be an issue when the number of VDI VMs is lower than the maximum allowed number of clients for the graphics card processor and a given profile. The problem will show up in the GPU utilization results as one GPU working near, or at capacity, while the other GPU processor is showing significantly less utilization. The “depth-first” scheme is not the default configuration for ESXi.

Dell recommends staying with the ESXi default “breadth-first” scheme for your initial Dell Precision Appliance for Wyse deployment. After a pilot or trial evaluation phase with your end user’s applications, daily workflow and usage patterns as a barometer; you will be able to more effectively decide if adjusting the vGPU allocation scheme is required to meet the performance and end user experience expectations that your VDI based users have or need.
For more information about the two allocation schemes and how to switch, refer to the Modifying GPU assignment for vGPU-Enabled VMs section in the NVIDIA GRID VIRTUAL GPU User Guide.

### 4.7 NVIDIA License Server

A Windows VM is required for the NVIDIA License Server when using NVIDIA GPU cards. This can be a Windows 8.1 or Windows Server 2012 machine [64-bit]. Dell recommends using a virtual machine with Windows Server 2012 R2. It should be placed on the vSphere server that houses all management VMs.

The license server should be joined to the domain. Firewalls can be disabled temporarily on the VM, or ensure that the ports the license server are open. It should be made sure that the License Server VM can ping its host, the VMware vCenter VM and all other management VMs in this set-up, and all hosts that are installed with the NVIDIA graphics card.

The License Server application requires a Java/Tomcat environment. All required applications will be installed with the NVIDIA Licenser Server installation, i.e. the Tomcat web container, except the Java runtime environment. This must be installed prior to running the NVIDIA License Server installation.

The 32-bit Standard Edition Java Runtime Environment 1.7.0 Update 13 is known to be working with the NVIDIA License server and the Tomcat application that comes with it. Later version may be compatible, but they must be 32-bit version.

After installing the Java Runtime environment, the NVIDIA License Server can be installed.

The License Server comes with a .zip file. NVIDIA License Server zip contents and their purpose are listed below:

- GRID License Server Release Notes.pdf (document)
- GRID License Server User Guide.pdf (document)
- setup.exe (installation file)

To install the License Server, follow the steps provided in the GRID License Server User Guide document.

### 4.8 Downloading and installing the Quick Start Tool

The Quick Start Tool (QST) for the Dell Precision Appliance for Wyse—VMware Horizon is used to configure the basic settings required to begin using the appliance and to automate the setup of the appliance, ESXi, the NVIDIA GPUs, and the VMs for vGPU graphics enabled virtual desktops.

To download the latest version of the QST, perform these tasks:

1. Got to the Dell TechCenter page for the Dell Precision Appliance for Wyse—VMware Horizon.
2. Download the Quick Start Tool.
3. If you have an existing older QST installed, uninstall it before installing the version you just downloaded.

After you download the QST from the Dell.com/support page for Dell PowerEdge R730, double-click the executable and follow the instructions on the screen to complete the installation process.
NOTE: The QST for the Dell Precision Appliance for Wyse is a freely available, unsupported tool provided for convenience with no guarantees. It is not required to configure, setup, or use your Dell Precision Appliance for Wyse, and is to be used at your own discretion and risk.

4.9 Using the Quick Start Tool

Dell recommends executing the QST from a Windows system that has a reliable and low latency connection to your appliance. This is important since the appliance is restarted during the configuration process, and the QST needs to regain connection to the appliance and the ESXi host’s management IP Address after the server restart is completed.

Double-click the Dell Wyse Appliance desktop shortcut to start the application. The application will guide you through a series of screens that prompt you for information required to configure your ESXi host appliance and deploy the GPUs, and the VMs for vGPU graphics enabled virtual desktops. The application screens are self-explanatory and are grouped in several sections by the task being performed.

You will be given an opportunity to review the information entered before the tool begins executing tasks. Progress bars in the right pane will show the progress of individual tasks. Each section will initiate more tasks and after all inputs have been entered, a screen will display the progress of all deployment tasks.

4.9.1 Selecting the VM resource options and vGPU profiles

VMs can be configured with different virtual resource options and vGPU profiles. The initial screen in the QST allows you to choose the virtual machine resource options (vCPU, vRAM, vDisk and vGPU profiles for the appliance that the tool is executing on. For more details about the vGPU profiles, refer to the NVIDIA Tesla GRID vGPU Profiles table in the vGPU Profiles section of the Dell Precision Appliance for Wyse – VMware Horizon Reference Architecture document.

4.9.2 Configuring virtual machines

During the deployment, the tool will allow you to create the maximum number of supported virtual machines on the appliance. Alternatively, a virtual machine image can be created that can be used to provision up to 128 graphics enabled VMs (number varies depending on the GPU card and vGPU profile chosen). Created virtual machines can be any combination of Windows 7, Windows 8.1, Windows 10, or RHEL 6/x7.x desktops, provided that the selected graphics profile supports the operating system.

Virtual machines created by the QST can be launched from the Finish page in the QST, which allows users to install an operating system, via ISO image, physical disk, or network boot installation.

NOTE: Dell recommends performing VDI optimization tasks such as disabling unnecessary services. The settings and services that need to be modified will depend on your specific needs and environment.
Suggested sources for template optimization information include:

- VMware Horizon 7 documentation. Refer to the Virtualization Software Documentation section in this document.
- Windows Optimization Guide for Desktops and Servers in View in Horizon; Horizon Air Desktops; and Horizon Air Apps.
- VMware OS Optimization Tool (for non-production system use).
- This list is not exhaustive, various examples can be found online for Windows 7, 8.x, and 10.

**NOTE:** Dell recommends evaluating or testing suggested modifications before saving in your template VM.

### 4.10 Installing the VM guest operating system and graphics driver

After the **Using the Quick Start Tool** step has been completed, the next step is to install the Guest OS(s) that you selected in the preceding step. After installing the Guest OS(s), the NVIDIA vGPU graphics driver will be installed.

#### 4.10.1 Installing Microsoft Windows 7

**NOTE:**

Before you install the Microsoft Windows 7 operating system, make sure that you have the:

- Microsoft Windows 7 Disk Image File (ISO), CD, USB, or network install.
- VM Boot Option set to EFI. For more information about the EFI Boot Option, see the VMware documentation.[28494].

- The mouse cursor may not be responsive until you install the VMware Tools. You may have to use the keyboard for performing the following steps. See the Installing the VMware Tools topic to install the VMware Tools for your operating system.

1. Power on the VM using the vSphere Web Client.
2. Under Virtual Machine Configuration, click the configured VM.
3. Click on Launch Remote Console.
4. The VMware Remote Console opens and the Invalid Security Certificate dialog box may be displayed.
5. Click Connect Anyway.
6. Click the green triangle to start the virtual machine.
7. Follow the instructions to install Microsoft Windows 7 at Microsoft website. Once Windows 7 is installed, installing the graphics driver software step below can be completed.

#### 4.10.1.1 Installing the NVIDIA GPU graphics driver

For the most current information, refer to the Booting the VM and Installing Drivers section in the NVIDIA GRID VIRTUAL GPU User Guide. Note that the Guest OS driver must be matched with the ESXi host vib driver that you downloaded and installed in the Required files and NVIDIA driver installation [.vib] sections.
4.10.1.2 Post NVIDIA GPU graphics driver installation steps

The steps shown below, while optional, are recommended to complete prior to restarting the Guest OS after the NVIDIA GPU graphics driver is successfully installed.

1. As an option, you can run the DirectX Diagnostic Tool, `dxdiag` command from a Windows command prompt or the Start/Run menu dialog box. The DirectX Diagnostic Tool Display tab will show the graphics device that is installed and configured for use. Refer to Microsoft KB 179113 and scroll down to the How to check which version of DirectX is installed section for more information about how to run the `dxdiag` command.

2. Before rebooting the Guest OS after installing the NVIDIA driver, IT Administrators may wish to enable RDP access at this stage so that the Windows VM and desktop can be accessed after the Guest OS is rebooted. This is an important step since after the Guest OS reboots, the main display may be switched over to the NVIDIA vGPU graphics adapter, and as a result the Windows desktop may not be accessible from a VMware Remote Console session. See the Troubleshooting section for more information.

4.10.2 Installing Windows 8.1

**NOTE:**

• Before you install the Microsoft Windows 8.1 operating system, make sure that you have the:
  – Microsoft Windows 8.1 Disk Image File (ISO), CD, USB, or network install.
  – VM Boot Option set to EFI. For more information about the EFI Boot Option, see the VMware documentation — 28494.
  
• The mouse cursor may not be responsive until you install the VMware Tools. You may have to use the keyboard for performing the following steps. See the Installing the VMware Tools topic to install the VMware Tools for your operating system.

1. Power on the VM using the vSphere Web Client.
2. Under Virtual Machine Configuration, click the configured VM.
3. Click on Launch Remote Console.
4. The VMware Remote Console opens and the Invalid Security Certificate dialog box may be displayed.
5. Click Connect Anyway.
6. Click the green triangle to start the virtual machine.
7. Follow the instructions to install Microsoft Windows 8.1 at Microsoft website. Once Windows 7 is installed, installing the graphics driver software step below can be completed.

4.10.2.1 Installing the NVIDIA GPU graphics driver

For the most current information, refer to the Booting the VM and Installing Drivers section in the NVIDIA GRID VIRTUAL GPU User Guide. Note that the Guest OS driver must be matched with the ESXi host vib driver that you downloaded and installed in the Required files and NVIDIA driver installation [.vib] sections.

4.10.2.2 Post NVIDIA GPU graphics driver installation steps

The steps shown below, while optional, are recommended to complete prior to restarting the Guest OS after the NVIDIA GPU graphics driver is successfully installed.
1. As an option, you can run the DirectX Diagnostic Tool, `dxdiag` command from a Windows command prompt or the Start/Run menu dialog box. The DirectX Diagnostic Tool Display tab will show the graphics device that is installed and configured for use. Refer to Microsoft KB 179113 and scroll down to the How to check which version of DirectX is installed section for more information about how to run the `dxdiag` command.

2. Before rebooting the Guest OS after installing the NVIDIA driver, IT Administrators may wish to enable RDP access at this stage so that the Windows VM and desktop can be accessed after the Guest OS is rebooted. This is an important step since after the Guest OS reboots, the main display may be switched over to the NVIDIA vGPU graphics adapter, and as a result the Windows desktop may not be accessible from a VMware Remote Console session. See the Troubleshooting section for more information.

### 4.10.3 Installing Red Hat Enterprise Linux 6/7

**NOTE:**

- Before you install the Red Hat Enterprise Linux 6/7 operating system, make sure that you have the:
  - Red Hat Linux Enterprise Linux 6/7 Disk Image File (ISO), CD, USB, or network install.
  - VM Boot Option set to EFI. For more information about the EFI Boot Option, see the VMware documentation — 28494.

- The mouse cursor may not be responsive until you install the VMware Tools. You may have to use the keyboard for performing the following steps. See the Installing the VMware Tools topic to install the VMware Tools for your operating system.

1. Power on the VM using the vSphere Web Client.
2. Under Virtual Machine Configuration, click the configured VM.
3. Click on Launch Remote Console.
4. The VMware Remote Console opens and the Invalid Security Certificate dialog box may be displayed.
5. Click Connect Anyway.
6. Click the green triangle to start the virtual machine.

### 4.10.3.1 Installing the NVIDIA GPU graphics driver

For the most current information, refer to the INSTALLING VGPU DRIVERS section in the NVIDIA GRID VIRTUAL GPU User Guide. It is recommended to review the prerequisites, and specific instructions that may vary depending upon the Linux distribution. Note that the Guest OS driver must be matched with the ESXi host vib driver that you downloaded and installed in the Required files and NVIDIA driver installation [.vib] sections.
Post NVIDIA GPU graphics driver installation steps
The steps shown below, while optional, are recommended to complete prior to restarting the guest operating system after the NVIDIA GPU graphics driver is successfully installed.

IT Administrators may wish to enable remote VNC access at this stage so that the Linux VM and desktop can be accessed after the Guest OS is rebooted. This is an important step since after the Guest OS reboots, the main display may be switched over to the NVIDIA vGPU graphics adapter, and as a result the Linux desktop may not be accessible from a VMware Remote Console session.
4.11 Installing the VMware Tools

It is necessary to install the VMware Tools in the Guest OS for enhanced functionality. To install the VMware Tools in your operating system(s), follow the steps below:

1. For Windows Guest OS’s, refer to [Installing and upgrading VMware Tools in vSphere (2004754)](https://www.vmware.com/support/pubs/vsphere_tools.html).
2. For Linux based Guest OS’s, refer to the [Installing and Configuring VMware Tools](https://www.vmware.com/support/pubs/vsphere_tools.html) document.

4.12 Installing the VMware Horizon Agent

Instructions for how to install the Horizon Agent for Linux and Windows Guest OS(s), or virtual machines, are listed in the sections below.

4.12.1 Windows guest operating system

Instructions for how to install the Horizon Agent for Windows VMs are available in the [Install Horizon Agent on an Unmanaged Machine](https://www.vmware.com/support/pubs/vsphere_tools.html) section in the [Documentation Center for VMware Horizon 7](https://www.vmware.com/support/pubs/vsphere_tools.html).

4.12.2 Linux guest operating system

Instructions for how to install the Horizon Agent for Linux VMs are available in the [Install Horizon Agent on an Unmanaged Machine](https://www.vmware.com/support/pubs/vsphere_tools.html) section in the [Documentation Center for VMware Horizon 7](https://www.vmware.com/support/pubs/vsphere_tools.html).

4.13 Licensing VM guest operating system

For the most current information, refer to the [NVIDIA GRID LICENSING User Guide](https://www.nvidia.com/Professional/Software/GRID/). On Windows:

4.13.1 Windows guest operating system licensing

The [LICENSING ON WINDOWS](https://www.nvidia.com/Professional/Software/GRID/) section in the [NVIDIA GRID LICENSING User Guide](https://www.nvidia.com/Professional/Software/GRID/) provides the steps required to manage licenses. The NVIDIA Control Panel is used to access and manage the licensed features. The Windows Registry key `HKEY_LOCAL_MACHINE\SOFTWARE\NVIDIA Corporation\Global\GridLicensing` can be edited. If you prefer to automate the process, [Group Policy](https://support.microsoft.com/en-us/kb/103135) is one method that can be used.

4.13.2 Linux guest operating system licensing

The [LICENSING ON LINUX](https://www.nvidia.com/Professional/Software/GRID/) section in the [NVIDIA GRID LICENSING User Guide](https://www.nvidia.com/Professional/Software/GRID/) provides the steps required to manage licenses. Editing `/etc/nvidia/gridd.conf` is required to access and manage the licensed features.
4.14 Scaling your deployment

The process for deploying appliances in a scaled out configuration (more than one appliance) is the same as for a single appliance and is accomplished by following the tasks in the Prerequisites, Cabling your appliance, First boot experience, Joining appliance to vSphere Datacenter and VMware Horizon Infrastructure, Downloading and installing the QST, and Using the Quick Start Tool sections. Note that if QST is already installed on your management system, that step can be skipped.

Scaling vertically within a single appliance is supported up to 128 VMs (depending upon the GPU card and vGPU Profile selected). Scaling horizontally is achieved by adding additional appliances to the vSphere cluster and VMware Horizon infrastructure. For more information, refer to the Scaling Guidance section in the Dell Precision Appliance for Wyse – VMware Horizon Reference Architecture document.
5 Dell Precision Appliance for Wyse - Clients

After you configure the virtual machines for your Dell Precision Appliance for Wyse, the next step is to connect a PCoIP Zero Client to the VMware Horizon based remote virtual machine.

5.1 Connecting a PCoIP Zero Client to VMware Horizon

This section provides an overview for how to connect to a client virtual machine from a Dell Wyse PCoIP Zero Client. Refer to the Dell Precision Appliance for Wyse – VMware Reference Architecture for more information about recommended Dell Wyse PCoIP Zero Clients.

By default, the Dell Wyse PCoIP Zero Clients may be configured out of the box to connect to a VMware Horizon infrastructure. Brief steps for connecting into a VMware Horizon Agent Direction, or a View Connection Server are show below. The steps below may vary slightly based upon the PCoIP Zero Client you are configuring. Refer to the Wyse Quick-Start Guide for your particular Wyse PCoIP Zero Client model for more information.

5.1.1 Connecting to the VMware Horizon Agent Direct-Connection

NOTE: For production environments, Dell recommends using VMware Horizon broker for proper connectivity and management instead of the Direct-Connection agent.

The View Agent Direct-Connection Plug-in Administration section has instructions and steps for installing and configuring the Plug-in. For more information refer to the Documentation Center for VMware Horizon 7.

Note that the View Agent must already be installed on the Guest OS. The View Agent Direct-Connection Plug-In System Requirements section has additional system requirements details.

After successfully installing the View Agent, and the View Agent-Direct Connection Plug-In; to access the Direct Connection Agent from a PCoIP Zero Client, follow the steps below:

1. In the Zero Client’s Administration console, click on the Options menu.
2. Click on the Configuration Menu.
3. Navigate to the Session tab.
4. Click on the Unlock tab.
5. Enter the administrative password.
6. For the Session Connection Type option, select the Auto Detect option.
7. Enter the IP Address for the Guest OS. The IP Address is used by the VMware Horizon Agent Direct-Connection Plug-In.
8. Click Connect, and follow the onscreen steps to authenticate and connect to the remote desktop.
9. Note that the connection process may take some time to establish the remote session and render the remote VM’s desktop on the display that is attached to the PCoIP Zero Client. When this occurs, the desktop may appear to be blank.
5.1.2 Connecting to the VMware Horizon Connection Server

To access the View Connection Server from a PCoIP Zero Client, follow the steps below:

1. Enter the IP Address for the View Connection Server.
2. Click Connect and follow the onscreen steps to authenticate and connect to the remote desktop.

For more information refer to the Documentation Center for VMware Horizon 7.
Upgrading virtualization software to latest version

Dell recommends checking for upgrades and mandatory hotfixes for your virtualization software and appliance after you've completed the deployment of your appliance(s); as well as periodically to ensure you are using the latest version as new versions may contain important enhancements or fixes. Please keep in mind that this is a generalized recommendation, and may not apply to the GPU VIB (ESXi driver) and the paired Guest OS client graphics driver. In particular for NVIDIA GRID, client licenses have to be remapped when updating from a 2.0 to 3.1 GRID implementation. Refer to the Software Components and Pre-requisites section for more details about the specific required software versions.

To check for and download the latest VMware Horizon and vSphere ESXi software for your appliance, browse to https://my.vmware.com/en/web/vmware/downloads and scroll down to the Desktop & End-User Computing/VMware Horizon section. To further narrow the search, select the current version installed on your appliance. For ESXi, Dell provides custom images for the PowerEdge R730 platform. To find the latest supported custom image, perform these tasks:

1. On the Dell Support page, click Product Support, and then click Browse for a product.
2. Click the Servers, Storage & Networking link, click PowerEdge, and then click your server model.

NOTE: Alternately, the appliance’s Service Tag number can be entered on the support page for accessing the documentation. Refer to the Locating Your System Service Tag section to locate your service tag number.

3. On the Product Support page, click the Drivers & downloads link.
4. In the Optimize your system with drivers and updates section, click on the Change OS link.
5. Click on the VMware ESXi 6.0 option.
6. Click on the Enterprise Solutions link.
7. Look for the VMware ESXi 6.0 Update 2 section.
8. Click on the Download link.
7 Getting help

7.1 Locating your system service tag

Your system is identified by a unique Express Service Code and Service Tag number. This information is used by Dell to route support calls to the appropriate personnel. The Express Service Code and Service Tag are found on the front of the system by pulling out the information tag.

![Figure 1 Service Tag location](image)

7.2 Contacting Dell

Dell provides several online and telephone-based support and service options. If you do not have an active Internet connection, you can find contact information on your purchase invoice, packing slip, bill, or Dell product catalog. Availability varies by country and product, and some services may not be available in your area.

To contact Dell for sales, technical support, or customer-service issues:

1. Go to [Dell.com/support](https://www.dell.com/support).
2. Select your country from the drop-down menu on the bottom right corner of the page.
3. For customized support:
   a. Enter your system Service Tag in the **Enter your Service Tag** field.
   b. Click **Submit**.
   c. The support page that lists the various support categories is displayed.
4. For general support:
   a. Select your product category.
   b. Select your product segment.
   c. Select your product.
   d. The support page that lists the various support categories is displayed.
5. For international contacts, go to [Dell.com/contactdell](https://www.dell.com/contactdell)
6. To contact Dell ProSupport, keep your Service Tag ready and go to [Dell.com/support/softwarecontacts](https://www.dell.com/support/softwarecontacts)
7.3 Quick Resource Locator

Use the Quick Resource Locator (QRL) to get immediate access to system information and how-to videos. This can be done by visiting Dell.com/QRL or by using your smartphone or tablet and a model specific Quick Resource (QR) code located on your Dell system. The QR code can be found on your appliance chassis.
8 Recovering your appliance

In the event that the primary SD card fails and you do not have the 2nd SD Card installed in the IDSM (Internal Dual SD Module) and configured for redundancy, then replacing the failed SD card is required along with reinstalling ESXi. If this occurs, please contact Dell Support for guidance on how to resolve.

Deploy Your Appliance

Refer to the Deploying Your Appliance section in this document and perform all tasks including the prerequisites.
## Troubleshooting

The table below lists possible causes and workarounds in the event you encounter issues. Possible cause and workaround are shown below.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Workaround</th>
</tr>
</thead>
<tbody>
<tr>
<td>You receive a blank or grey screen upon connection from a zero client or software client.</td>
<td>Press Windows key + the P key. The Control Panel will help setup the monitors and resolutions properly, if it is not auto-detected.</td>
</tr>
<tr>
<td>The message “Source signal on other port” is displayed on the display.</td>
<td>This indicates that a video source connected to the VM may not correspond with the video port used on the Thin Client. This can be corrected by swapping the video ports used on the zero client.</td>
</tr>
<tr>
<td>The connection process may take some time to establish the remote session and render the remote VM's desktop on the display that is attached to the PCoIP Zero Client. When this occurs, the desktop may appear to be blank.</td>
<td>Wait for a minute or so for the remote desktop to be rendered. Depending upon your remote desktop configuration and the network conditions, the rendering time may vary.</td>
</tr>
</tbody>
</table>

### Booting From Hard Drive C: No Boot Device Available

Initializing and establishing link

The boot device order may be changed after updating BIOS.

1. Boot the R730 into System BIOS
2. Go to System BIOS Settings
3. Then go to Integrated Devices
4. Verify that Internal SD Card Port is set to ON
5. Verify that Internal SD Primary Card = SD Card 1
6. Next, go to System BIOS Settings/Boot Settings/BIOS Boot Settings
7. Scroll down (if using a mouse), or if keyboard, arrow down key, until you see Hard-Disk Drive Sequence
8. Check that the Internal SD: IDSDM (Internal Dual SD Module) is listed above the Integrated RAID Controller 1
9. If the IDSDM is not listed above the Integrated RAID Controller 1, then BIOS will try to boot into the RAID Container\Volume that supports the ESXi vmfs datastore
10. Since that volume is not bootable, the server will not be able to boot into an OS or hypervisor
11. If the IDSDM is not listed above the Integrated RAID Controller 1, move it up the list to be above the Integrated RAID Controller 1
12. Save changes when prompted by BIOS Setup, and then reboot the R730 when prompted by BIOS Setup
   Upon next boot, the R730 should boot into ESXi from the IDSDM
A Rolling back an unsuccessful deployment

During execution of the Quick Start Tool (QST), events may occur that cause the deployment to fail. This could be caused by prerequisites not being met, an issue in the network environment, incorrect information being entered into the tool, or some other unforeseen issue. After the issue has been resolved, follow the process in this section to remove the failed deployment and revert your appliance to a state where deployment can be attempted again.

**WARNING:** This process will remove an attempted deployment and is intended to be used only when destroying a virtualization deployment is desired.

**NOTE:** The process may vary depending on if you’re rolling back a standalone (all-in-one) appliance deployment or an appliance that is part of a vSphere Datacenter and VMware Horizon deployment.

A.1 Failed appliance deployment

If a failure occurs while deploying an appliance, follow these tasks to remove all changes made so the deployment can be attempted again.

**Appliance Changes**

These tasks are performed while logged in to a system(s) that is running the QST and the vSphere Web Client:

1. If the **Quick Start Tool** is still running, close it. Start **Task Manager** and ensure that **Dell Wyse Appliance.exe** is not running. If it is, click on the name to select and click the **End task** button.
2. Connect to the appliance via a standalone vSphere Web Client session, or from a vSphere Web Client session that is connected to your vSphere Datacenter.
3. Select your appliance, right click, and in the pop-out menu chose **Maintenance Mode**, and then select **Enter Maintenance Mode**.
4. After the appliance has entered Maintenance Mode, power off any VMs that may be running.
5. Confirm that the VM(s) are powered off, then select the appliance, and select **Power Reboot** from the pop-out menu.

**NOTE:** Putting the appliance (ESXi host) in Maintenance Mode and shutting down the VMs will help shorten the ESXi host reboot time, and also allow you to visually inspect the Events, and Recent Tasks in the vSphere Web Client view as the information in the Events and Recent Tasks may contain useful information and clues.

6. Once the appliance has restarted, connect to it again from the vSphere Web Client session.
7. Confirm that all VMs have been deleted.
a. Even though QST has a feature that can delete existing VMs, removing them manually will set the appliance back to its original configuration prior to running QST.

8. Exit Maintenance Mode.